CAAssociates

Chelsea-Sandwich LLC
Bulk Terminal
Chelsea, Massachusetts

Emission Compliance Test Program

RTO, Residual Oil Loading Bays, Residual Oil Storage Tanks

Compliance Test Protocol

CAAssociates
December, 2009
Project No. 09-017

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1.0 INTRODUCTION

1.1 General

Eastmount Environmental Services, LLC of Newburyport, MA and CAAssosiates of Acton, MA , under the oversight of M.J. Bradley & Associates, have been retained by Chelsea-Sandwich, LLC (Cheslea-Sandwich) to conduct emissions compliance testing at their Chelsea, MA facility. The objective of the emissions test program will be to demonstrate compliance with the following requirements set forth in Conditional Approval MBR-08-IND-007 issued by the Massachusetts Department of Environmental Protection (MassDEP):

- That the Adwest Regenerative Thermal Oxidizer (RTO) meets the overall 99.0% Destruction Efficiency (DE) for Volatile Organic Compounds (VOC)
- That the Adwest Regenerative Thermal Oxidizer (RTO) meets the overall 99.0% DE for Total Reduced Sulfur (TRS).
- That the capture system installed at the residual oil truck loading racks meets the required 90% capture efficiency
- That the capture system installed at the residual oil storage tank vents meets that required 95% capture efficiency.

The compliance testing requirements within MBR-08-IND-007 also requires "that the VOC concentration in the residual oil is determined for inclusion in the facilities SOMP". As a fossil fuel, residual oil is comprised of virtually 100 percent volatile organic compounds and testing is not needed to establish that fact. The composition may vary from shipment to shipment regarding to the exact proportions of individual organic compounds. However, there is not an established correlation between evaporative emissions and the infinite variations that could occur with complex chemical analysis.

Because there is no established correlation between liquid residual sample analysis and VOC emission calculations, this protocol proposes that the inlet VOC results be used in conjunction with past inlet testing results to document the concentration of VOC is at or below the level used to calculate potential emissions (2,000 ppm as propane).

Testing has been tentatively scheduled for the week of January 25th, 2010, pending MassDEP approval. A summary of the primary parties involved in this test program as well as the applicable emission limitations are presented in Tables 1-1 and 1-2, respectively.

1.2 Program Overview

Eastmount will conduct three inlet/outlet test runs in order to determine the overall DE of the RTO that controls emissions from the facility's residual oil storage tanks and the residual oil loading lanes of the loading rack. Each test run will be comprised of the simultaneous inlet/outlet sampling to the control device for the determination of flow rate (scfm) and Total NonMethane Hydrocarbons (TNMHC in ppm and lb/hr, referenced to propane).

In conjunction with these measurements, CAAssociates will also take three sets of Tedlar bag samples at the inlet and the outlet of the RTO for TRS analysis to determine the DE of TRS

CAAssociates will also demonstrate that the storage tanks and loading racks meet the required capture efficiencies through flow measurements to confirm the design specifications of the capture systems.

1.3 Protocol Organization

The remainder of this Test Protocol is divided into four additional sections. Section 2 provides a detailed description of the RTO and facility operations. Section 3 presents a summary of the sampling locations to be utilized by the reference method. Section 4 provides a description of the flue gas monitoring methods, equipment and procedures. Section 5 addresses the quality assurance/quality control aspects of the program.

Table 1-1 Test Program Informational Summary

Source Information	
Facility Name:	Chelsea-Sandwich, LLC
Address:	11 Broadway Chelsea, MA 02150
Contact:	Mr. Jim Lally
Phone:	(617) 660-1100
Test Firm Information	
Test Organization:	Eastmount Environmental Services, LLC
Address:	65 Parker Street, Unit 3

	Newburyport, MA 01950
Contact:	Mr. Anthony Stratton
Phone:	(978) 499-9300
Regulatory Information	
Organization:	Massachusetts Department of Environmental Protection – Northeast Region
Address:	205B Lowell Street Wilmington, MA 01887
Contact:	Mr. Joseph Su
Phone:	(978) 694-3283
Testing Consultant Information	
Consultant:	CAAssociates
Address:	16 Revolutionary Road Acton, MA 10720
Contact:	Mr. Paul Murphy
Phone:	(978) 263-4895
Permitting Consultant Information	
Consultant:	M.J. Bradley & Associates
Address:	1000 Elm Street, Second Floor Manchester, NH 03101
Contact:	Steve Piper
Phone:	(603) 647-5746 ext 102

Table 1-2 Summary of Test Requirements

Source	Location	Parameters/Methods	Runs	Duration	Limits
RTO	Inlet	Flow – 1-4[1] THC – 25A	3	60-min	99.0% DRE
		Sulfur - ASTM D5504-01		Extended Grab	
	Outlet	Flow – 1-4[2] THC – 25A CH_4 – 18	3	60-min	
		Sulfur - ASTM D5504-01		Extended Grab	
Tanks[4]	102, 103, 104, 106, 203, 204	Capture[3]	1	N/A	95%
Racks	G, H, J, K, L, M, N, O, P, R	Capture[3]	1	N/A	90%

1 A value of 29.0 will be assigned to the inlet location for dry gas molecular weight (Section 8.6 of EPA Method 2). Thus, no actual O_2, and CO_2 calculations will be conducted at the inlet during this test program. Inlet moistures will be measured via the wet/dry bulb approximation technique

2 Outlet fixed gases will be determined on a real time basis in accordance with EPA Method 3A and/or analysis of integrated bags while outlet moistures will be calculated utilizing a modified EPA Method 4 train.

3 The sources for which capture demonstrations must be performed do not conform to industry norms upon which Method 204 was developed. Chelsea-Sandwich is proposing an alternative method, as discussed in Section 4 below, to accommodate the unusual process circumstances.

4 The permit lists Tank 202 as a Residual Oil tank. However, it has been switched to a distillate oil tank with no plans to return to residual oil service.

2.0 PROCESS DESCRIPTION

2.1 Facility Description

The Chelsea-Sandwich LLC facility is located at 11 Broadway in Chelsea, MA. This facility handles distillate and residual oil products. The facility receives petroleum products by ship or barge into onsite storage tanks and then loads over-the-highway trucks and barges from their storage tanks.

2.2 Source Description

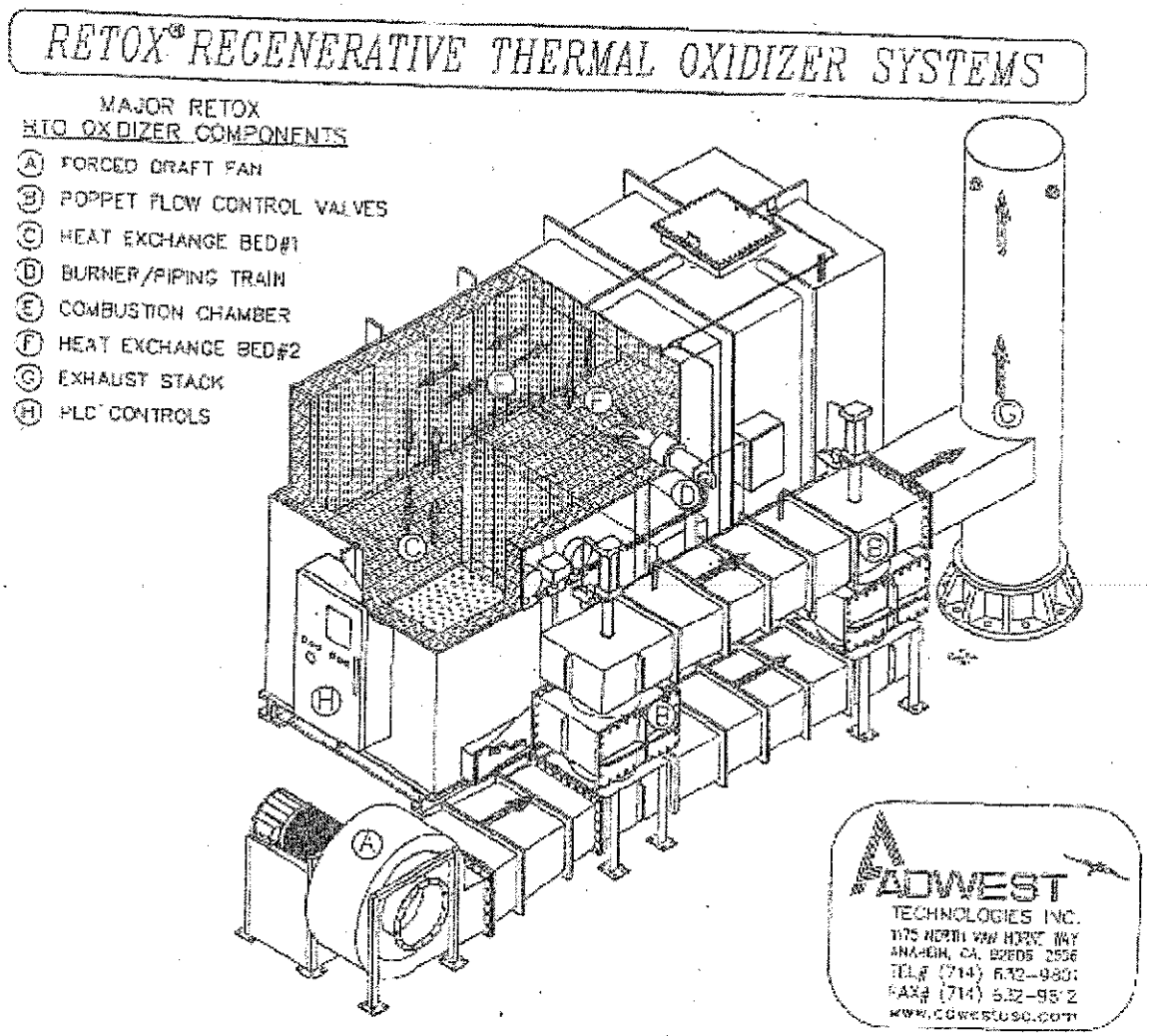
The subject source consists of the areas of the facility that store and deliver residual fuel oil. The emission units associated with storage, as identified in the Conditional Approval, include EU4-102, EU5-103, EU6-104, EU8-106, EU19-202, EU20-203 and EU21-204, which correspond to tanks 102, 103, 104, 106, 202, 203, and 204, respectively. (Note the Tank 202 has been switched distillate oil service with no plan for returning to residual oil service.) The emission units associated with delivery include EU25, but only those bays used to delivery residual oil. The residual oil bays include bays G, H, J, K, L, M, N, O, P and R. A capture system has been installed at each tank and loading rack in No 6 fuel oil service. The capture system delivers vapors from working and breathing losses to a regenerative thermal oxidizer (RTO) for control. A brief description of each aspect of the control system is provided below.

2.2.1 RTO

Chelsea-Sandwich LLC installed a regenerative thermal oxidizer (RTO) with maximum design flow capacity of 9,000 scfm to destruct the VOC and TRS emissions from the evaporative losses associated with the residual oil storage tanks and the residual oil truck loading operations. A diagram of the unit is provided in Figure 2-1. The vendor performance guarantee for the RTO is 99% destruction efficiency of VOC and TRS operating at a minimum chamber temperature of 1,500 F (design residence time is 1.0 second).

Emissions captured for control by the proposed RTO include those from the residual oil storage tanks and the residual oil truck loading. These sources contain the majority of TRS, which make them the target of the odor control strategy. The following describe the emission collection system for the two source types.

Figure 2-1, RTO schematic



2.2.2 Tank Vents

The capture system for the residual oil storage tanks is an exhaust system that originally planned to maintain a constant draw of up to 850 cfm. The basis for the design flow rate is to handle the displaced air from the tank headspace during a filling operation that has a maximum pump rate of a ship (9,000 barrels/hour). However, upon review, it was determined that virtually all residual oil is received by barge with a maximum pump rate of 6,000 barrels/hour which equates to a needed draw of 560 cfm. (In the event the terminal receives a load of residual oil from a ship off loading at a rate greater than 6,000 barrels/hour, the product will be pumped to two storage tanks simultaneously.)

During times when the tank is not filling, the capture system will maintain a constant exhaust rate in order to capture vapor displacement associated with other operations, such as tank-to-tank transfers, air sparging and any breathing emissions associated with the residual oil tanks. The exhaust system features a hood design that fits over each tank's vent such that any portion of the exhaust rate that is not from the tank displacement will come from intake of fresh air. The purpose of the hood design is to assure that the tank is always stabilized to atmospheric pressure in order to meet petroleum tank safety requirements that assure tanks do not distort due to overpressure or collapse due to vacuum. The capture efficiency rating by the design engineer is minimally 95%.

2.2.3 Truck Loading

The capture system for the residual oil truck loading is a flex hose arrangement that maintains a constant draw of up to 300 cfm from each loading lane. The use of flex hose is necessitated to enable effective use for the different truck heights that may load at the rack. Additionally, the residual loading is accomplished by a top-loading arm that goes down into the truck hatch. The flex hose is positioned by the operator beside the loading arm. The flex hose cannot have a tight connection, as it is necessary for the operator to view the oil level in the truck to eliminate any risk of overflow spillage. Because the truck has varying diameter hatches the capture efficiency rating by the design engineer is 90%.

3.0 SAMPLING LOCATIONS

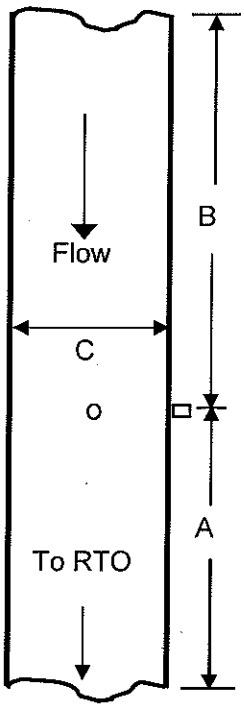
3.1 RTO – Inlet

Inlet gases are directed from the storage tanks and loading racks to the RTO via a series of trunks. Inlet sampling will be conducted following the convergence of all trunks at two locations, one for THC concentration and one for flow. THC sampling will take place prior to the RTO's mist eliminator filter system and will be placed in the centroidal area of the stack. The inlet flow location is after the filter system and before the ID fan. It is comprised of two ports at 90° to each other in a vertical (flow downward) section of stack. The inlet location has an inside diameter of 26". The port locations do not meet EPA Method 1 criteria. However, preliminary testing has found that this location yields flow rates that are consistent with the RTO outlet measurements. A schematic detailing all sampling points is presented in Figure 3-1.

3.2 RTO - Outlet

Outlet gases from the RTO are directed to a circular (24") vertical exhaust stack. The two ports are located 90° from each other and meet the minimum EPA Method 1 criteria. The ports are located at a minimum of 2.0 equivalent diameters downstream and 0.5 equivalent diameters upstream from the closest bend or expected pollutant concentration change. A schematic detailing all sampling points is presented in Figure 3-2.

Figure 3-1 RTO - Inlet Sampling Configuration

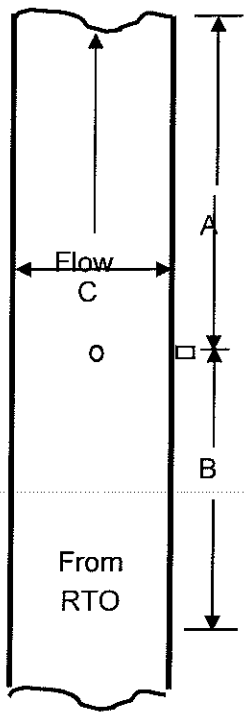


Stack Configuration		
Description	**Distance**	**Equivalent Diameters**
Upstream (A)	n/a	<0.5
Downstream (B)	n/a	<2.0
Diameter (C)	26"	NA
Number Of Ports	2	NA
Flow Traverse Points (per diameter)		
Traverse Points	**% of diameter**	**Distance (inches)**
1	3.2	
2	10.5	
3	19.4	
4	32.3	
5	67.7	
6	80.6	
7	89.5	
8	96.8	

THC Sampling Points:

- **THC will be sampled at a single point within the centroidal area of the stack during each test run.**
- **Moisture will be determined utilizing the wet bulb / dry bulb technique.**

Figure 3-2 RTO - Outlet Sampling Configuration



Stack Configuration		
Description	**Distance[1]**	**Equivalent Diameters**
Upstream (A)	> 12"	> 0.5
Downstream (B)	> 48"	> 2.0
Diameter (C)	24"	NA
Number Of Ports	2	NA
Flow Traverse Points (per diameter)		
Traverse Points	**% of diameter**	**Distance (inches)**
1	4.4	1.1
2	14.6	3.5
3	29.6	7.1
4	70.4	16.9
5	85.4	20.5
6	95.6	22.9

THC Sampling Points:

- **THC will be sampled at a single point within the centroidal area of the stack during each test run.**
- **Moisture will be determined by utilizing a midget moisture train from a single point in the centroidal area of the stack.**
- **Methane will be analyzed from the outlet location only.**

[1] – Measurements will be verified at the time of testing to comply with EPA Method 1.

4.0 TEST PROCEDURES

4.1 Overview

The Adwest RTO at Chelsea-Sandwich will be tested in order to determine the units' compliance status with respect to the facility's air permit as set forth by the Commonwealth of Massachusetts Department of Environmental Protection within Conditional Approval MBR-08-IND-007. Each pollutant parameter will be tested in strict accordance with official EPA procedures at the sampling locations previously described. This section details the test procedures that will be used during this test program.

4.2 Methodology

4.2.1 Non-Methane Hydrocarbons – EPA Methods 25A and 18

Total Hydrocarbons will be measured at the inlet and outlet test locations while methane will be analyzed at only the RTO outlet. Methane will be assumed to be zero at the inlet location as there is no gas firing prior to this point.

Total hydrocarbons (THC) will be determined in accordance with EPA Method 25A. Eastmount will meet the requirements of Method 25A by utilizing two TECO Model 51 Flame Ionization Detector (FID) analyzers as well as a VIG Industries 200 analyzer (methane only). All analyzers will be calibrated with certified propane in air standards. It is anticipated that the inlet will be operated on a 0-10,000 ppm range and the outlet will be operated on a 0-1,000 ppm range. The analyzers will be calibrated prior to and following each test run to ensure the accuracy of the test data.

The methane concentration will be determined in accordance with EPA reference Method 18, *Measurement of Gaseous Organic Compound Emissions by Gas Chromatography*. Eastmount will use a VIG Industries Model 200 Duel Channel FID with an internal gas chromatograph (GC) column to determine methane concentrations. The system will be calibrated using three certified standards of methane introduced to the analyzer that will generate a curve around the expected flue gas concentrations. Inside the analyzer itself, sample is split and delivered to both the GC column and the FID that measures total hydrocarbons. The samples will be automatically injected into the GC once every 3 minutes, while total hydrocarbons are measured on a real time, continuous basis.

Non-methane hydrocarbons will be determined by subtracting the methane value from the THC value at each test location during each test run. Destruction removal efficiency will based off of the total non-methane hydrocarbon mass emission rates at the respective test locations.

4.2.2 Capture Demonstration

- **Truck Loading** – Ba sed on the recommended design criteria, Chelsea-Sandwich will demonstrate that the static pressure in the plenum used to exhaust the loading rack be maintained at a minimum vacuum of 8 inches of water column. A velocity measurement (and calculated flow) will be performed in the common header as a means to establish a correlation to the static pressure. Because each loading lane exhaust is connected to the common header, the flow of each will be one ninth of the total flow. Because the 90% capture design is based on 300 cfm per lane, the compliance test will verify that the total flow from the loading rack header is at least 3,000 cfm. Future flow verification will be able to use the output of the pressure gauge rather than the face velocity requirement listed in MBR-08-IND-007, Table 3.

- **Tank Vents** – Based on the recommended design criteria, Chelsea-Sandwich will demonstrate that the static pressure in the plenum used to exhaust each tank be maintained at a minimum vacuum of 5 inches of water column. During the compliance test, velocity measurements (and calculated flow rates) will be performed on each tank's emission collection line and correlated to a pressure reading. Because the 95% capture is based on 560 cfm per tank, the compliance test will verify that the flow of each tank's line is at least 560 cfm. Future flow verification will be able to use the output of a pressure gauge rather than the face velocity requirement listed in MBR-08-IND-007, Table 3.

  To supplement the static pressure measurement, the capture efficiency will be evaluated using a hand-held organic vapor analyzer (Photovac MicroFID, or equivalent) in two key points in the hood. The first point to be tested will be the fresh air intake of the hood. The second point will be in the headspace of the hood, just prior to the exit duct that feeds the RTO. Capture efficiency will be verified based on the ratio of the THC concentration at the fresh air intake to that of the exit duct.

In addition to the verification of the duct static pressure, Chelsea-Sandwich will develop a Standard Operating and Maintenance Procedure (SOMP) to ensure that the exhaust system is operational.

4.3 Description of THC and Methane Sampling

4.3.1 Total Hydrocarbon and Methane Sampling System

What follows is a description of the transportable continuous emissions monitor system used to quantify total hydrocarbon emissions. The system meets all the specifications of Reference Method 18 and 25A:

- **Probe** - A single opening stainless steel probe with an in-stack sintered filter will be used at each sample location. The probe will be of sufficient length to reach the centroidal area of the respective sample locations.

- **Calibration Tee** - Stainless steel tee (3/8") located between the probe and the filter will allow the operator to inject calibration gas through the entire sampling system. Excess calibration gas exits the probe eliminating any potential over pressurization.

- **Sample Line** - A heated 3/8" OD Teflon sample line will be used to transport the sample stream from the test locations to the analyzers. The lines will be heated to approximately 300°F to prevent condensation of hydrocarbons before reaching the analyzer.

- **System Calibration Line** - A ¼" OD Teflon tube will be used to transfer calibration gas from the cylinder to the calibration valve.

- **Sample Pump** - A leak-free pump will be used to pull the sample gas through the system at a flow rate sufficient to minimize the response time of the measurement system. The components of the pump that contact the gas stream are constructed of stainless steel or Teflon. The sample pump is heated to prevent condensation.

- **Sample gas manifold** – A heated Teflon manifold will allow distribution of inlet and outlet samples to respective analyzers. The manifold is equipped with sample pressure gauges, thermometer, heater, and Teflon components. It also allows distribution to other instruments or measurement sources such as a gas chromatograph or Tedlar bag. When filling bags, a rotameter allows the flow rate to be visually adjusted.

- **VOC Analyzer** – A Teco Model 51 flame ionization analyzer (FIA) will be used to measure THC at both the inlet and outlet locations, while outlet concentrations of methane will be measured by utilizing a VIG Industries Model 200 FIA.

- **Data Acquisition** - The FIA's response will be recorded on a Dell Vostro 1710, 1.60 GHz computer working in unison with an Iotech Data Acquisition System (Personnel Daq 55/56). This system is programmed to collect data once every 2 seconds, while reporting 1-minute averages. This software operates in a Windows environment.

4.3.2 Total Hydrocarbon and Methane Sampling Procedures

The FIAs will be calibrated prior to sampling using zero, low, mid and high calibration gases of certified cylinders of propane in a balance of air. Calibrations will be conducted through the entire sample system. A description of the specific procedures is provided below:

- **Zero:** The zero point of the analyzer will be determined using a pre-purified cylinder of air. The zero point will be analyzed for a minimum of five minutes to monitor drift before sampling commences.

- **Low:** The low calibration gas will be 25-35% of span. It will be introduced to the sample system and the response of the analyzer will be recorded.

- **Mid:** The mid calibration gas will be 45-55% of span. It will be introduced to the sample system and the response of the analyzer will be recorded.

- **High:** The high calibration gas will be 80-90% of span. It will be introduced to the sample system and the response of the analyzer will be adjusted accordingly.

Once the analyzers are calibrated, the system calibration valve will be switched to sample mode and sampling will commence. The response time of the system will be determined from the time the valve was actuated to the time the response of the FIA is 95% of the steady state sample value. The DAS will then record the analyzer response throughout the test run. Following the test run, the sampling system will be post calibrated. The post calibration will consist of delivering zero and a representative upscale calibration point through the entire sampling system and recording the system response. This response will be used in conjunction with the initial system calibration in order to determine calibration drift over the test run period.

4.4 Reference Method Volumetric Flow Determination

In conjunction with each CEMS monitoring run, Eastmount will conduct a moisture sample and a flow traverse in accordance with EPA Methods 1-4, 40CFR60, Appendix A. The design specifications for this train meet all the criteria of EPA's Reference Method 1-4 as found in the

Federal Regulations under Section 40CFR60 Appendix A, as amended. The following is a description of the individual components that comprised the sampling train.

4.4.1 Velocity and Temperature Profile

Eastmount will conduct volumetric flowrate determinations during this test program in accordance with procedures delineated in EPA Methods 1 and 2, 40CFR60, Appendix A. The system components necessary to conduct this testing are detailed below.

- **Pitot Tube** – A standard pitot tube will be used to measure all gas velocities. The pitot tube will meet all of the dimensional criteria set forth in Method 2, therefore a coefficient of 0.99 will be used.
- **Pitot Lines** - The pitot tube will be connected to a manometer via leak free Tygon and teflon tubing.
- **Manometer** - An inclined manometer capable of measuring ten inches of water column pressure drop will be used.
- **Thermocouple** - A "K" type thermocouple will be used to monitor the stack temperature at each traverse point.
- **Static Pressure** – One static pressure measurement will be conducted during each test run by rotating the pitot tubes perpendicular to the direction of flow, disconnecting the negative pitot (if positive) and recording the deflection of the manometer.
- **Barometric Pressure** - The barometric pressure will be determined on-site using an aneroid barometer that was previously calibrated at Eastmount's laboratory using a NIST traceable mercury barometer.
- **Gas Molecular Weight Determination** - The O_2 and CO_2 content of the sample gas will be measured in accordance with EPA Method 3 and 3A (method 3 for the inlet and 3A for the outlet) or equivalent, 40CFR60, Appendix A.

4.4.2 Moisture Determination

Eastmount will conduct one moisture approximation determination during each test run at both the inlet and outlet test locations. Eastmount will either conduct the wet bulb/dry bulb (for locations under ~200 degrees F) or the Alternative Moisture Measurement Method (Midget Impingers) allowed under Method 4 (for locations >200 degrees F). A synopsis of the procedure is presented below.

1. **Sample Train Preparation** – Sample train preparation will consist of the following:

- Place 10ml of deionized water in each of the first 2 midget impingers.
- Leave third impinger empty
- Place approximately 15 grams of silica gel in the fourth impinger.
- Record Initial volumes and weights on the field data for each impinger.
- Assemble entire sampling train.

2. **Pre-Test Leak Check** - The system will be leak checked by disconnecting the first impinger from the probe and, while blocking the impinger inlet and activating the pump. An acceptable leak check is achieved when the rotometer indicates no flow and bubbling is limited to 1 bubble per second.

3. **Sampling** – A personal sampling pump will be used to collect a sample at 1 liter/minute throughout the duration of each test run. The sample gas volume will be determined by the personal sampling pump operating type in conjunction with the pumps calibrated collection rate.

4. **Post-Test Leak Check** - Upon completion of each test run, the system will be leak checked as described in Item 2.

5. **Sample Recovery** - The impingers will then be recovered quantitatively for determination of net condensate gain.

4.5 Total Reduced Sulfur

In conjunction with each CEMS monitoring run, CAAssociates will collect Tedlar bag samples for TRS. Samples will be analyzed in accordance with ASTM D5504-01. To conform to the method's rigorous holding time criteria, these samples must analyzed within 24 hours of collection.

4.5.1 TRS Sampling System

CAAssociates will fill Tedlar bags with a slipstream of the inlet and out locations using an evacuated lung assembly in accordance with procedures delineated in EPA Method 18 as delineated in 40CFR60, Appendix A. The system components necessary to conduct this testing are detailed below.

- **Probe** - A single opening Teflon probe be used at each sample location. The probe will be of sufficient length to reach the centroidal area of the respective sample locations.
- **Tedlar Bags** - The samples bags are constructed of a chemically inert substance to reduce influence of the material on the concentration of the pollutants in the sample. Each

bag is equipped with a valve that, when open, allows the bag to be filled and/or purged. Bag volumes can be either 1 liter, 3 liter or 5 liter.

- **Evacuated Lung** – A leak-free chamber with valving system that allows the creation of a vacuum inside the chamber.
- **Pump** – A pump is used to create the vacuum in the evacuated lung. The pump pulls air that is inside the chamber surrounding the Tedlar bag and dumps it outside the chamber. This allows sample air from the duct to replace the volume removed by the pump by filling the bag. The pump will be equipped with a flow regulator to allow an integrated bag sample to be pulled over a period of time. A Gillian personnel sampling pump, or functionally equivalent pumping system, will be used.
- **Stop watch** – For measuring the averaging period of the sample.

4.5.2 TRS Sampling Procedures

To ensure that the minimum holding time criteria are met, all samples will be taken in the afternoon. All bags will be new and unused to ensure sample integrity.

- **Sample Train Assembly** - To begin the sampling event, the bag will be loading into the chamber of the evacuated lung assembly. A fresh probe consisting of ¼ inch Teflon tubing will be placed in the duct and connected to the evacuated lung assembly. The Tedlar bag will be loaded into the evacuated lung and the pump will be connected to the lung assembly.
- **Sample Purge** – With the Tedlar bag closed, the probe will be purged to flush the internal volume of the probe with sample.
- **Sampling** – once the probe has been purged, the sample may commence. The bag will be opened to the sample line and the pump turned on to evacuate the chamber. As the chamber air is removed, sample fills the Tadlar bag to replace the volume.
- **Analysis** – When the sampling run is complete, each bag will be labeled with the name of the facility, location, date, time and required analysis. Samples will be analyzed for total reduced sulfur in accordance with ASTM D5504-01.

5.0 QUALITY ASSURANCE/QUALITY CONTROL

5.1 Overview

Sampling will be conducted by trained personnel with extensive experience in Reference Method sampling. All sampling and analysis will be conducted in strict accordance with EPA test procedures. The quality control procedures found in the EPA Quality Assurance Handbook for Air Pollution Measurement Systems will be adhered to as well.

All calculations will be conducted in strict accordance with the equations found in the individual Methods. Emission rate calculations will be conducted on a computer and the input data will be checked by a person other than the original calculator to ensure that it is correct.

Strict QA/QC protocols will be followed during all phases of this project. These protocols include:

- QA objectives for measurement data;
- Data reduction;
- Internal QC;
- Calibration of equipment;
- Corrective action, if necessary; and
- Use of standardized field data sheets.

These specific procedures in addition to Eastmount's usual high standard of quality control will help validate the results obtained in this test program. Eastmount is staffed by a team of qualified and experienced environmental professionals. As the majority of our emissions testing work is done for compliance purposes, strict QC procedures are incorporated into our everyday work performance.

5.2 Equipment Calibrations

Eastmount's pitot tubes, thermocouples and barometers are maintained in accordance with specifications set forth in EPA "Quality Assurance Handbook for Air Pollution Measurement Systems - Volume III Stationary Source Specific Methods" and with manufacturer's suggested procedures. A summary is presented below:

- **Balance** - All analytical balances are calibrated against Class M weights. A daily onsite check is also conducted using a Class S weight.

- **Thermocouples** - All type K thermocouples are calibrated against ASTM mercury in glass thermometers at two points. The first point is in an ice bath and the second at the boiling point of water.

- **Pitot Tubes** - All standard and Type "S" stainless steel pitot tubes are designed to meet the dimensional criteria set forth in Method 2, therefore a coefficient of 0.99 (standard) or 0.84 (Type "S") will be used.

5.3 Final Report

All test results for each source will be presented in an easy to read table format. Any deviations from approved monitoring methods will be discussed in full. The report will be sectioned as follows:

- Introduction
- Summary of Results
- Process Description
- Sampling Locations
- Test Procedures
- QA/QC
- Appendices (all supporting reference method and process data)

APPENDIX A

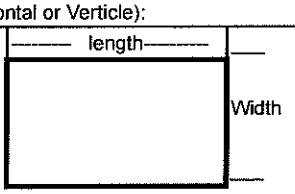
Example Field Data Sheets & Equipment Specifications

Eastmount Environmental Services, LLC

EPA Method 1

Sample and Velocity Traverses for Stationary Sources

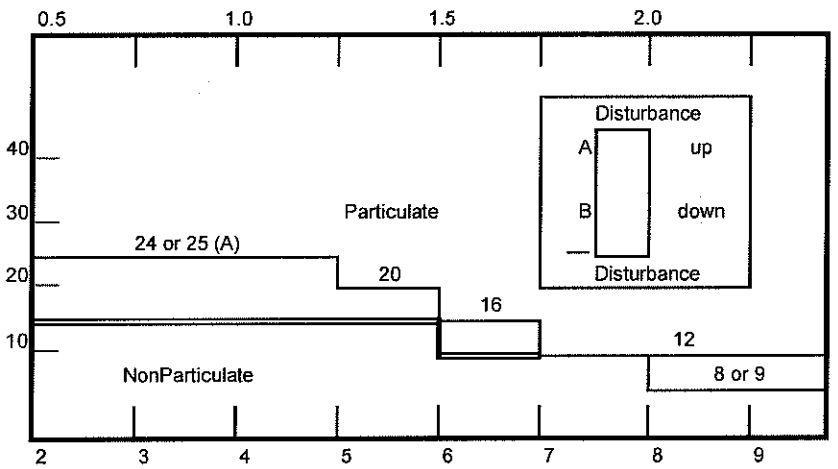
Client:	Diameters Upstream of Disturbance (A):
Facility:	Diameters Downstream of Disturbance (B):
City, State:	Total Number of Traverse Points Required:
Test Date:	Number of Ports:
Test Location:	Traverse Points Per Point:
Diameter of Stack:	Traverse (Horizontal or Verticle):



MINIMUM NUMBER OF TRAVERSE POINTS FOR PARTICULATE AND NONPARTICULATE TRAVERSES

Duct Diameters Upstream from flow Disturbances

(Disturbance A)



Duct Diameters DownstreamForm Flow Disturbances

(Disturbance B)

$$Deq = \frac{2LW}{L + W} = \_\_\_\_\_$$

Cross-Sectional Layout For Rectangular Stacks	
Total Points	Matrix
9	3 x 3
12	4 x 3
16	4 x 4
20	5 x 4
25	5 x 5

LOCATION OF TRAVERSE POINTS IN CIRCULAR STACKS

Point Number On A Diameter	Number of Traverse Points on a Diameter (Percent of stack diameter from inside wall to a traverse point)				
	4	6	8	10	12
1	6.7	4.4	3.2	2.6	2.1
2	25.0	14.6	10.5	8.2	6.7
3	75.0	29.6	19.4	14.6	11.8
4	93.3	70.4	32.3	22.6	17.7
5		85.4	67.7	34.2	25.0
6		95.6	80.6	65.8	35.6
7			89.5	77.4	64.4
8			96.8	85.4	75.0
9				91.8	82.3
10				97.4	88.2
11					93.3
12					97.9

TRAVERSE POINT LOCATIONS

Number	Distance from Wall (inches)	Port Depth (inches)	Total Distance (inches)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

Eastmount Environmental Services, LLC

EPA Method 2 Field Data Sheet

Client:		
Facility:		
Site Location:		
Source:		
Test Location:		
Duct Diameter:		
Test Date:		
Testers:		
Pitot Number:		
Pitot Coefficient:		
Test Number:		
Test Time:		
Ambient Temperature:		
Barometric Pressure:		
Duct Static Pressure:		
	Pre / Post	
Leak Checks:	/	
Pump Calibration		
	Initial	Final
1		
2		
3		
Impinger Volume		
1		
2		
3		

Port Number	Traverse Point	Velocity Pressure	Stack Temp.

Client/Site: _____ Operator: _____

Source: _____ Date: _____

RM Response Times: Upscale (seconds): _____ Downscale (seconds): _____

Note: System Response Time is the longer of the upscale and downscale response times. Performed during initial zero and bias checks:

Analyzer Calibration Error (ACE) – Reference Method

Pollutant/Diluent	Low		Mid		High/Full Scale (CS)	
	Cylinder Value (C_v)	Analyzer Response (C_{Dir})	Cylinder Value (C_v)	Analyzer Response (C_{Dir})	Cylinder Value (C_v)	Analyzer Response (C_{Dir})
Oxygen						
Carbon Dioxide						
Carbon Monoxide						
Oxides of Nitrogen						
Sulfur Dioxide						

Range selected for analyzer operation:

O_2	CO_2	CO	NO_x	SO_2

Protocol Gases Used During Program

Cylinder No.	Diluent/Pollutant Concentration(s)

Analyzer Calibration Error (ACE) Acceptance Criteria: ≤± 2%,

Where: ACE = $[(C_{Dir} - C_v)/CS] * 100\%$

Client:/Site: _____ Operator: _____

Source: _____ Date: _____

Run Number: _____

Start Time: _____

End Time: _____

System Bias (SB)/Drift (D) Assessments – Reference Method

Pollutant/Diluent	Start Zero		Start Span (C_{Ma})		Final Zero		Final Span (C_{Ma})	
	Cylinder Value (C_v)	Analyzer Response (C_s)	Cylinder Value (C_v)	Analyzer Response (C_s)	Cylinder Value (C_v)	Analyzer Response (C_s)	Cylinder Value (C_v)	Analyzer Response (C_s)
Oxygen								
Carbon Dioxide								
Carbon Monoxide								
Oxides of Nitrogen								
Sulfur Dioxide								

Range Selected for analyzer operation:

O_2	CO_2	CO	NO_x	SO_2

Sampling System Bias (SB) Criteria: ≤± 5% of span for zero and upscale gas, where:

Where: $SB = [(C_s - C_{Dir})/CS] * 100\%$

Zero and Calibration Drift (D) Criteria: ≤± 3% of span, where:

$D = |SB_{final} - SB_i|$

Method 25A Data Sheet

Client _____
Facility _____
Source _____
Test Location _____
Date _____

THC Analyzer Data

Manufacturer _____
Model/Serial Number _____
Fuel Pressure _____
Combustion Air Pressure _____
Sample Pressure _____
Measurement Range _____

Calibration Error Test Data		
Calibration Gas	Cylinder Concentration	Actual Response
Zero Gas		
High Gas		
Response Line		
Response Line = (Ha/Za)/(Hc-Zc)		

Test Data

Test Number	1	2	3
Start Time			
Stop Time			
Testers			

Calibration Gas	Cylinder Concentration	Predicted Response	Actual Response	Calibration Error	Criteria Acceptance
Low Gas					< 5% of cylinder concentration
Mid Gas					< 5% of cylinder concentration

Predicted Response = (Cylinder Concentration) x (Response Line)
Calibration Error = (Actual Response - Predicted Response) / Cylinder Concentration x 100

Calibration Drift Test Data						
Calibration Gas	Cylinder Concentration	CE Test Response	Actual Response	Calibration Drift	Criteria Acceptance	
Test Run 1 Zero					< 3% of the measurement range	
Test Run 1 Mid					< 3% of the measurement range	
					Test Run 1 Avg. Conc.	
Test Run 2 Zero					< 3% of the measurement range	
Test Run 2 Mid					< 3% of the measurement range	
					Test Run 2 Avg. Conc.	
Test Run 3 Zero					< 3% of the measurement range	
Test Run 3 Mid					< 3% of the measurement range	
Calibration Drift = (Actual Response - CE Test Response) * 100 / Measurement Range					Test Run 2 Avg. Conc.	

Gas Cylinder Data						
Calibration Gas	Required % of Span	Cylinder Concentration	Cylinder Composition	Cylinder Number	Expiration Date	Actual % of Span
Fuel						
Combustion Air						
Zero Gas						
Mid Gas						
High Gas						

Eastmount Environmental's
CONTINUOUS EMISSION MONITORING DESCRIPTION

INSTRUMENT : Teledyne Oxygen Gas Analyzer
MODEL #: 326A

PERFORMANCE SPECIFICATIONS:

SENSITIVITY:	Equipped with the following linear ranges: 0-1%, 0-5%, 0-25%
ACCURACY:	± 1% of scale at constant temperature
LINEARITY:	± 1% of full scale
RESPONSE TIME:	At the specified flowrate (2scfm), 90% in 7 seconds
OUTPUT:	4 - 20 mA in 1% range only

PRINCIPLE OF OPERATION: The stack gas is continuously extracted and a portion of the sample is conveyed to an instrumental analyzer for determination of O_2 which uses a mirco fuel cell that provides an electrical signal that is directly proportional to the oxygen concentration in the gas immediately adjacent to its sensing surface.

APPLICABLE EPA METHODS: 40CFR60 Appendix A Method 3A - Determination of Oxygen and Carbon Dioxide concentrations in Emissions from Stationary Sources. (Instrumental Analyzer Procedures)

Eastmount Environmental's
CONTINUOUS EMISSION MONITORING DESCRIPTION

INSTRUMENT :	Fuji CO_2 Gas Analyzer
MODEL #:	3400

PERFORMANCE SPECIFICATIONS:

SENSITIVITY:	Equipped with the range 0 - 20%
ACCURACY:	± 0.5% of full scale
LINEARITY:	± 2% of full scale
RESPONSE TIME:	For 90% indication the response time to actual gas is 15 seconds maximum
OUTPUT:	0 - 1V and 4 - 20 mA
PRINCIPLE OF OPERATION:	The stack gas is continuously extracted and a portion of the sample is conveyed to an instrumental analyzer for determination of CO_2 concentration using a nondispersive infrared (NDIR) single beam analyzer.
APPLICABLE EPA METHODS:	40CFR60 Appendix A Method 3A - Determination of Oxygen and Carbon Dioxide Emissions from Stationary Sources.(Instrumental Analyzer Procedures)

CONTINUOUS EMISSION MONITORING DESCRIPTION

INSTRUMENT :	TECO THC Gas Analyzer
MODEL #:	51

PERFORMANCE SPECIFICATIONS:

SENSITIVITY:	Equipped with ranges 0–10, 100, 500 1000, 5000 & 10,000 ppm
ACCURACY:	2% of reading plus span gas accuracy ± 0.1 ppm
LINEARITY:	± 2% of full scale
RESPONSE TIME:	For 90% indication the response time to actual gas is 5 seconds
OUTPUT:	0 - 10V and 4 - 20 mA
PRINCIPLE OF OPERATION:	The stack gas is continuously extracted and a portion of the sample is conveyed to an instrumental analyzer for determination of total organic concentration using flame ionization detection.
APPLICABLE EPA METHODS:	40CFR60 Appendix A Method 25A - Determination of total gaseous organic concentration using a flame Ionization analyzer.

CONTINUOUS EMISSION MONITORING DESCRIPTION

INSTRUMENT :	VIG Industries Hydrocarbon Analyzer
MODEL #:	200

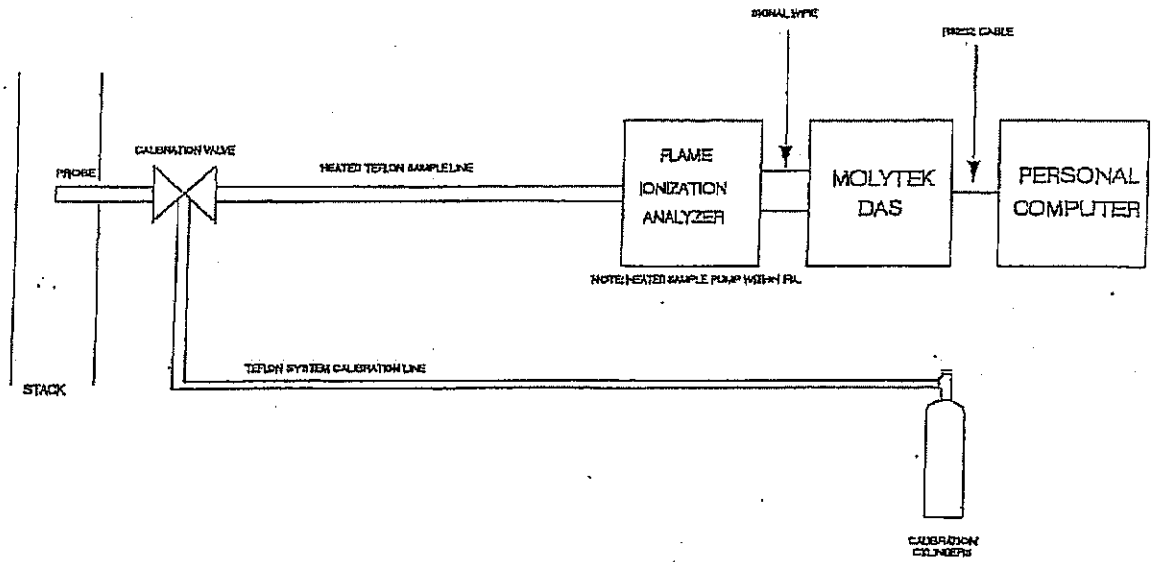
PERFORMANCE SPECIFICATIONS:

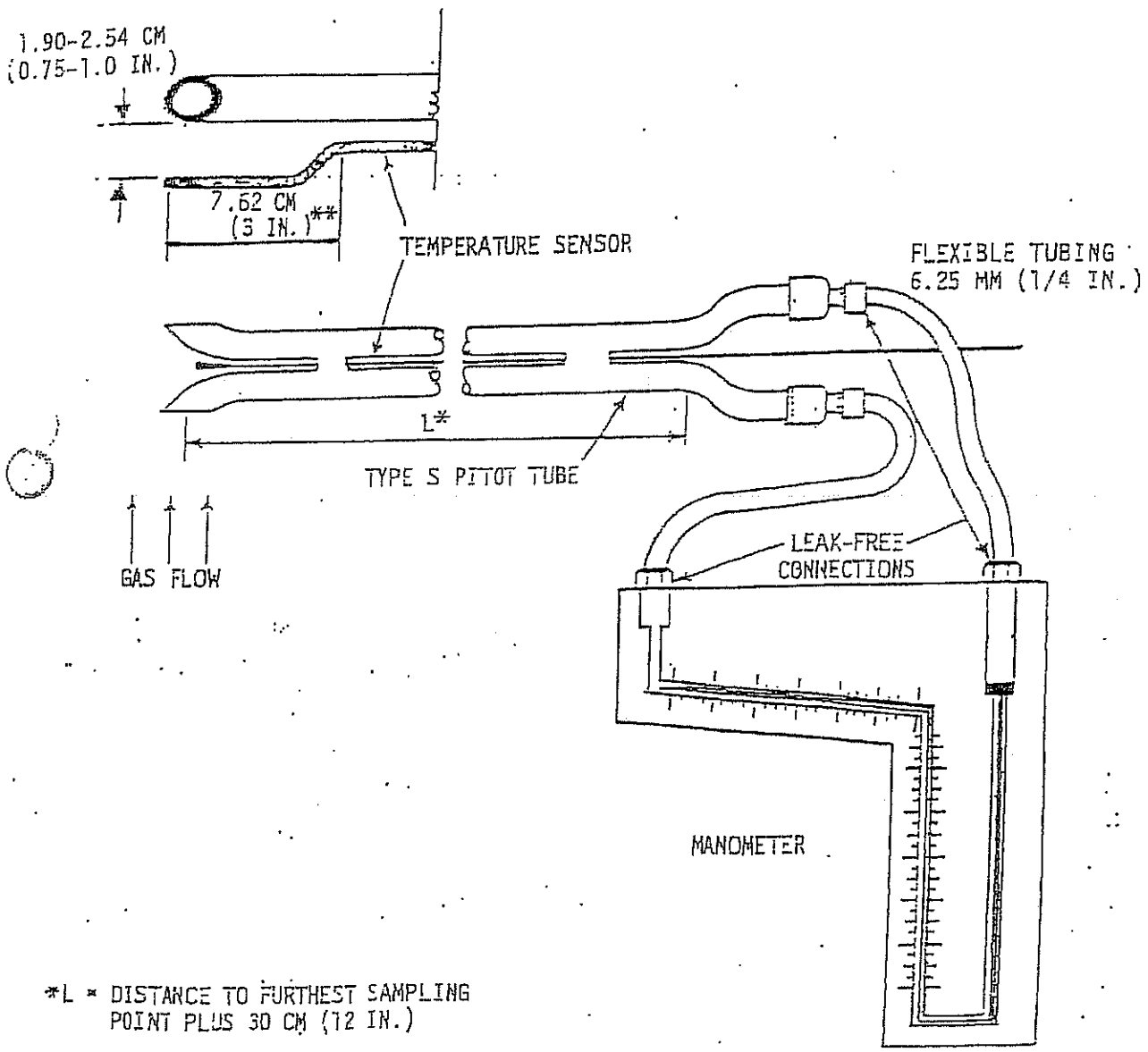
SENSITIVITY:	Equipped with the following linear ranges: 10, 100, 1000 and 10,000
ACCURACY:	± 1% of full scale, per 24 hours
LINEARITY:	± 1% of full scale
RESPONSE TIME:	For 90% indication the response time to actual gas is 5 seconds maximum
OUTPUT:	0 – 1, 5 or 10V and 4 - 20 mA
PRINCIPLE OF OPERATION:	The VIG Industries, Inc. Model-200 is a microprocessor based, oven heated methane / non methane / total hydrocarbon gas analyzer. The Model-200 uses two independent flame ionization detectors (FID), one to measure total hydrocarbons and the second coupled with a GC (gas chromatography) column for the separation of the methane and non methane components.
APPLICABLE EPA METHODS:	40CFR60 Appendix A Method 25A - Determination of total gaseous organic concentration using a flame Ionization analyzer. 40CFR60 Appendix A Method 18 – Determination of Gaseous Organic Compound Emissions by Gas Chromatography.

APPENDIX B

Sampling Train Schematics

METHOD 25A
SAMPLE SYSTEM



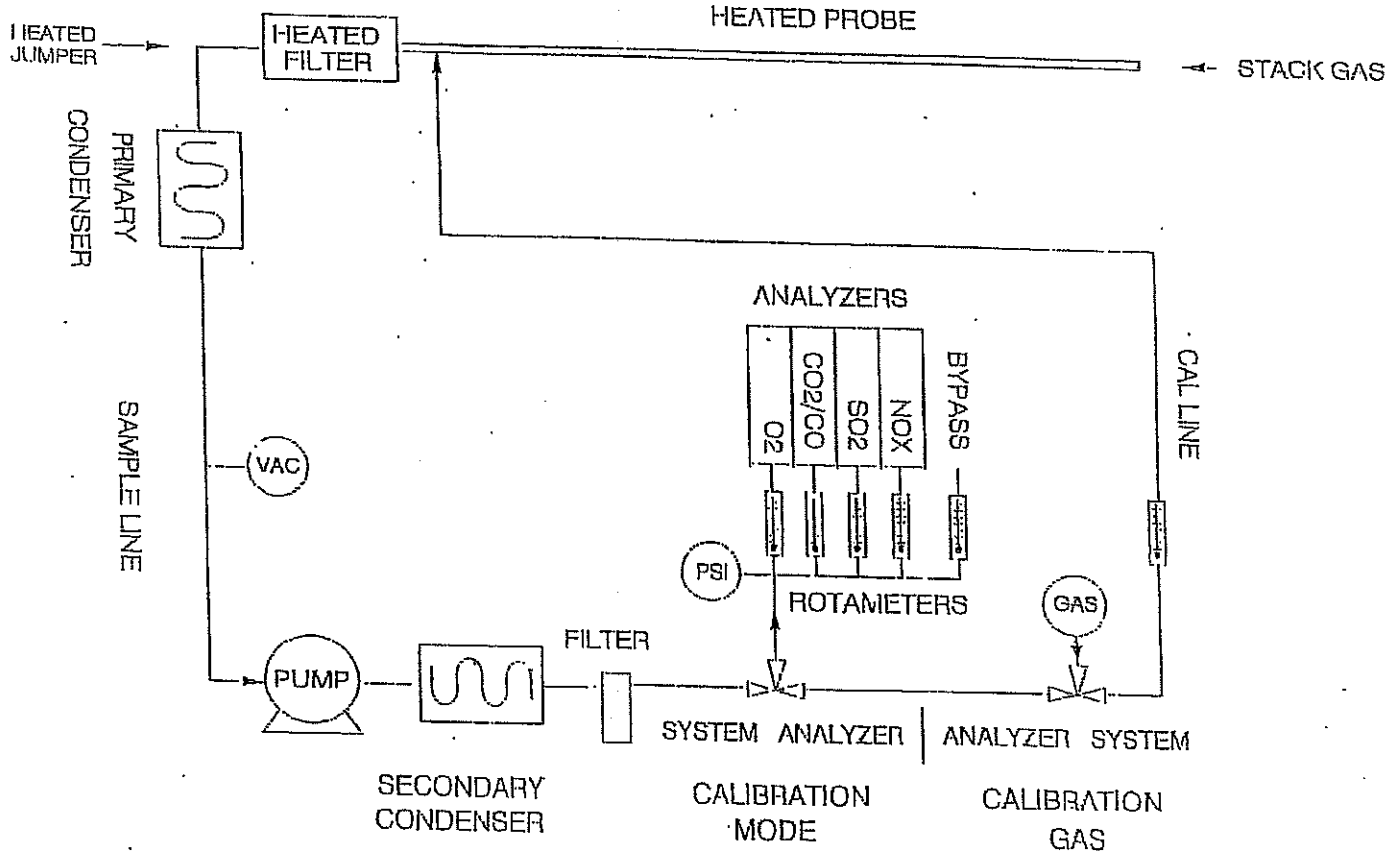


*L = DISTANCE TO FURTHEST SAMPLING POINT PLUS 30 CM (12 IN.)

**PITOT TUBE - TEMPERATURE SENSOR SPACING

Figure 3.1 Type S pitot tube-manometer assembly.

EXTRACTIVE CEM SYSTEM



APPENDIX C

Facility Permit – Conditional Approval MBR-08-IND-007

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NORTHEAST REGIONAL OFFICE
205B Lowell Street, Wilmington, MA 01887 • (978) 694-3200

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lieutenant Governor

IAN A. BOWLES
Secretary

LAURIE BURT
Commissioner

AUG 2 0 2008

Ronald Kenny
Chelsea-Sandwich LLC
Chelsea Terminal
11 Broadway
Chelsea, MA 02150

RE: **CHELSEA** – Metropolitan Boston/ Northeast Region
310 CMR 7.02 – Air Quality Non-Major Comprehensive Plan Application
Transmittal No. W213528
Application No. MBR-08-IND-007
CONDITIONAL APPROVAL

Dear Mr. Kenny:

The Metropolitan Boston/Northeast Regional Office ("NERO") of the Department of Environmental Protection, Bureau of Waste Prevention, ("MassDEP"), has reviewed your Non-Major Comprehensive Plan Application ("Application") listed above. This Application concerns the proposed installation and operation of a new Regenerative Thermal Oxidizer (RTO) as a means to reduce odors and volatile organic compounds (VOC) emissions from oil storage tanks and loading operations at your 11 Broadway, Chelsea facility. The Application also requests VOC emission limitations that will maintain the subject facility's current status as a minor source. The submitted Application was prepared by M. J. Bradley & Associates, Inc. and bears the seal and signature of Stephen Piper, Massachusetts P.E. No. 36039.

MassDEP has determined that your Application is administratively and technically complete and that the Application, specifications, and Standard Operating and Maintenance Procedures for the proposed equipment are in conformance with current air pollution control engineering practice, and hereby grants **Conditional Approval** for said Application, as submitted, subject to the conditions listed below.

Please review the entire Approval carefully, as it stipulates the particular conditions with which the facility owner/operator must comply in order for the facility to be operated in compliance with the Regulations. Failure to comply with this Approval will constitute a violation of the Regulations and can result in the revocation of the Approval.

1. BACKGROUND AND DESCRIPTION OF FACILITY

The Chelsea-Sandwich LLC facility has been operating as a petroleum storage and distribution facility for several decades in its present location, however in recent years, several odor complaints have been received from nearby residents. In an effort to address those

complaints, Chelsea-Sandwich LLC entered into an agreement with the Chelsea Board of Health on May 6, 2005, which resulted in the installation of a system to control these odors.

A dry scrubbing odor control system designed to control total reduced sulfur compounds (TRS), which are generally considered the leading cause of odors from petroleum handling facilities, was installed at the facility. The system was effective in reducing odors; however, the treatment bed life was found to be unacceptably short and in those instances when the system was off-line for maintenance, nearby residents again complained about odors from the facility.

In addition, testing revealed that VOC emission levels from the facility were higher than previously calculated using US EPA-published emission factors and could potentially exceed major source thresholds if left uncontrolled. In an effort to address both the odor (TRS) issue as well as in order to properly control the increased VOC emissions from the facility, Chelsea-Sandwich LLC has proposed to replace the existing dry scrubbing system with a new RTO. The RTO will control TRS as well as VOC and, in conjunction with facility wide VOC emission limitations, will allow the facility to continue to be classified as a minor source.

DESCRIPTION OF FACILITY

The Chelsea-Sandwich LLC facility handles both distillate and residual oil products and operates under the Standard Industrial Classification Code (SIC) 5171, Petroleum Bulk Stations and Terminals. The facility receives petroleum products by ship or barge and stores the products in fourteen (14) heated and non-heated fixed roof petroleum storage tanks. Residual and distillate oil products are then loaded into over-the-road tank trucks through a nine (9) bay truck loading rack or into barges for marine transport.

The proposed capture system and RTO control device will control VOC and TRS emissions from evaporative losses associated only with the seven (7) residual oil storage tanks and the residual truck loading operations (described in Table 1 below). These sources account for the majority of TRS and VOC emissions and as such, emissions from distillate oil storage tanks and loading operations will not be controlled by the proposed air pollutants capture and control system.

The proposed RTO is rated to handle a maximum of 9000 standard cubic feet per minute (scfm) of air and will achieve 99 weight percent (%) destruction efficiency of VOC and TRS while operating at a minimum chamber temperature of 1,500 degrees Fahrenheit (F). The RTO will burn natural gas at a maximum firing rate of 2,584 cubic feet per hour as a means to maintain the minimum operating temperature in the two reaction chambers and the unit will cycle from one chamber to the other every 3 to 5 minutes. Exhaust gases will exit the RTO through a 20-inch diameter steel stack with a maximum temperature of 160 degrees F at 81.6 feet per second. The exhaust stack will be 10 feet above the RTO and 20 feet above ground level.

The residual oil storage tanks emission collection system is designed to capture 95 percent of the vapor laden air from the vent system located on each of the seven residual oil tanks and transport it to the RTO. The system will maintain a constant draw at each tank of 850 cubic feet per minute, collecting air displaced from the tank head space during filling, tank to tank transfers, air sparging, and any breathing emissions associated with the residual oil tanks. The system is designed to allow fresh air to enter and escape through the vents in order to

prevent unsafe over or under pressurization of the storage tanks. The design flow rate is based on the maximum filling rate of 9,000 barrels of residual oil per hour.

The residual oil truck loading emission capture system is designed to capture 90 percent of the vapor laden air during loading operations and transport it to the RTO. The system will maintain a constant draw at each residual oil loading bay of 300 cubic feet per minute through 4-inch flex hose, collecting vapor laden air displaced from the tank truck head space during filling. Each flex hose is fitted with a disk that acts to cover the portion of the hatch opening not occupied by the top-loading arm. The maximum filling rate at each of the residual loading bays is 500 gallons per minute.

2. EMISSION UNIT IDENTIFICATION

The following existing emission units (Table 1) are located at the subject facility and regulated by this Approval:

Table 1

EMISSION UNIT (EU# - Tank#)	DESCRIPTION OF EMISSION UNIT	EU DESIGN CAPACITY	POLLUTION CONTROL DEVICE (PCD#)
EU4-102	Above Ground Vertical Fixed Roof Heated Storage Tank, Residual Oil	840,000 gallons	RTO (PCD1) Adwest Technologies Model RETOX 9.0 RTO095
EU5-103		840,000 gallons	
EU6-104		840,000 gallons	
EU8-106		840,000 gallons	
EU19-202		5,040,000 gallons	
EU20-203		3,150,000 gallons	
EU21-204		3,990,000 gallons	
EU25	Truck Loading Rack	500 gallons per minute per bay, six residual oil bays	
EU3-101	Above Ground Vertical Fixed Roof Storage Tank, Distillate oils, Additives, Misc.	840,000 gallons	N/A
EU7-105		840,000 gallons	
EU9-107		504,000 gallons	
EU10-108		840,000 gallons	
EU11-109		840,000 gallons	
EU12-110		30,000 gallons	
EU13-111		30,000 gallons	
EU14-114		4,000 gallons	
EU15-115		30,000 gallons	
EU16-116		5,200 gallons	
EU17-117		3,000 gallons	
EU18-201		4,200,000 gallons	
EU22-205		5,040,000 gallons	
EU23-BH1	Above Ground Horizontal Storage Tanks for Boilers, Residual Oil	5,000 gallons	
EU24-BH2		5,000 gallons	
EU26	Barge Loading	5,000 barrels/hr (avg)	
EU1	Boiler-BE&S Company-#6 Oil-0.5% S	12,000,000 Btu/hr	
EU2	Boiler-Superior-#6 Oil-0.5% S	9,860,000 Btu/hr	

+ **Table 1 Key:**

= Number
/hr = per hour
#6 Oil-0.5% S = residual oil number six with 0.5 percent sulfur content by weight
Tank # = Tank number
Btu/hr = British thermal units per hour
Avg = average

3. APPLICABLE REQUIREMENTS

A. EMISSION LIMITS AND RESTRICTIONS AND MINIMUM REQUIRED PCD OPERATING PARAMETERS

All residual and distillate products flow through the truck loading rack (EU25) or the barge loading system (EU26), consequently, limits on the amount of petroleum products pumped through these two emission units will be utilized as a means to control their contribution to facility-wide VOC and TRS emissions. The facility shall comply with the emission limits/restrictions and the minimum required operating parameters for PCD1 as contained in Table 2 below:

Table 2 +

EU#	RESTRICTION / OPERATING PARAMETERS	POLLUTANT	EMISSION LIMIT/STANDARD	APPLICABLE REGULATION AND/OR APPROVAL NUMBER
EU25	- Kerosene: 25m gallons per month, 50m gallons per 12 month rolling period - No. 2 Oil: 219m gallons per month, 438m gallons per 12 month rolling period - Residual Oil: 250m gallons per month, 500m gallons per 12 month rolling period - Residual Oil: 65,000 gallons per hour during PCD1 (RTO) upset conditions			
EU26	- Kerosene: 5m gallons per month, 10m gallons per 12 month rolling period - No. 2 Oil: 30m gallons per month, 60m gallons per 12 month rolling period - Residual Oil: 30m gallons per month, 60m gallons per 12 month rolling period			
PCD1	- 99.0% Destruction efficiency - 90 % Capture efficiency for Residual oil Truck loading rack - 95 % Capture efficiency for Residual oil Storage tanks - Minimum RTO combustion chamber temperature: 1500°, (During normal operations, loading through EU25 shall not begin until minimum temperature is achieved)	VOC	Maximum outlet concentration shall be determined during initial control system testing and shall be incorporated into the SOMP - 1.77 tons per month from residual oil truck loading rack - 3.54 tons per rolling twelve-month period from residual oil truck loading rack - 7.7 tons per month from residual oil tanks - 15.4 tons per rolling twelve-month period from residual oil tanks	310 CMR 7.02 Approval MBR-08-IND-007
		TRS	Maximum outlet concentration shall be determined during initial control system testing and shall be incorporated into the SOMP	
Facility-Wide	Emissions resulting from all EUs listed in Table 1	VOC	- 18.6 tons per month - 37.1 tons per rolling twelve-month period	310 CMR 7.02 Approval MBR-08-IND-007

\+ **Table 2 Key:**

EU# = Emission Unit Number
No. = number
% = weight percent
m = million
VOC = volatile organic compounds
TRS = total reduced sulfur
SOMP = standard operating and maintenance procedures

Note: PCD1 controls emissions associated with EU25 (residual oil truck loading rack) and all residual oil storage tanks

B. COMPLIANCE DEMONSTRATION

The facility shall comply with the monitoring/testing, record keeping, and reporting requirements as contained in Tables 3, 4, and 5 below:

Table 3

EU#	MONITORING/TESTING REQUIREMENTS
EU25, EU26	Monitor the amount of product loaded in order to demonstrate that the limits specified in Table 2 are not exceeded. This may be done using product receipt and sales data.
EU25 EU4-102 EU5-103 EU6-104 EU8-106 EU19-202 EU20-203 EU21-204	Operate a temperature monitoring and recording system to demonstrate that the RTO reaction chamber temperature is in continuous compliance with the minimum required temperature of 1500°F.
	In the event that the RTO cannot operate in accordance with manufacturer's specifications and Table 2 above, and cannot be repaired within seven (7) days, Chelsea-Sandwich LLC shall further limit operations or discontinue the residual oil truck loading as directed by the MassDEP, who will evaluate the necessity of residual oil deliveries scheduled.
	Chelsea-Sandwich LLC shall monitor the number of hours that the RTO is not in operation in order to quantify emissions during those time periods for the purpose of excess emission reporting and routine emission reporting.
	If not already listed in the facility's Standard Operating and Maintenance Procedures (SOMP), all corrective actions to be undertaken by Chelsea-Sandwich LLC under RTO or capture system related alarm conditions shall be added to the SOMP.
	The face velocity of the residual oil storage tank capture system and the residual oil truck loading capture system shall be monitored monthly to confirm conformance with the criteria contained in the SOMP. Optimal capture system face velocities shall be determined during compliance testing and incorporated into the SOMP.
	Within 90 days after the commencement of continuous operation of the new RTO, Chelsea-Sandwich LLC shall ensure that a compliance test shall be performed on the subject air pollution control system using methods approved by MassDEP in writing and as witnessed by MassDEP personnel. The compliance testing of the subject RTO must demonstrate, at minimum: a) whether or not the capture systems for the residual oil truck loading rack and the residual oil storage tanks achieve the capture efficiencies required in Table 2; and b) that the subject air pollution control system attains and maintains the required VOC and TRS destruction/removal efficiency of the new RTO system as specified in Table 2; and c) that the VOC concentration in the residual oil is determined for inclusion in the facilities SOMP. The compliance testing procedures must follow USEPA (40 CFR 60, Appendix A) and MassDEP methods and guidelines (capture determination may require a site-specific method to be developed and agreed to through the test protocol approval process). All compliance testing shall be witnessed by MassDEP personnel at a mutually agreeable time and date.
	At least thirty (30) days prior to the commencement of compliance testing at its facility, Chelsea-Sandwich LLC shall submit a pretest protocol to this Office for review and written MassDEP approval. This protocol shall describe the test methodologies, sampling point locations, sampling equipment, and the sampling and analytical procedures to be employed during the required compliance testing.
	Chelsea-Sandwich LLC personnel shall inspect and maintain the RTO and capture systems in accordance with the recommendations of the manufacturer and the SOMP, and shall inspect said equipment for proper operation at least on a daily basis.
	Chelsea-Sandwich LLC shall, on a semi annual basis, sample the residual fuel oil in order to determine the concentration of VOC in the fuel. The results of these samples shall be compared to that of the VOC content of the fuel at the time of initial compliance testing and the resultant VOC emissions calculations shall be adjusted to reflect any changes in the concentration of VOC.
	In the event that Chelsea-Sandwich LLC personnel detect odors or receive an odor complaint, Chelsea-Sandwich LLC shall take appropriate action to minimize emissions and to diagnose and repair the problem. Further, Chelsea-Sandwich LLC shall take any additional actions as required by the Consent Order entered into with the City of Chelsea.
Facility-Wide	Maintain on-site, at all times, a copy of the SOMP for the subject emission units listed in Table 1 of this Approval.
	Perform Emissions Compliance Testing (Stack Testing), in accordance with 310 CMR 7.13, and 40 CFR Part 60, Appendix A or any other testing if and when requested by MassDEP or EPA.
	Monitor facility operations such that compliance with the restrictions and emission limitations/standards contained in Table 2 of this Approval can be determined.
	Monitor operations such that information may be compiled for the preparation of a Source Registration/Emission Statement Form as required by 310 CMR 7.12.

Table 4

EU#	RECORD KEEPING REQUIREMENTS
EU25, EU26	Maintain monthly petroleum product throughput records as a means to demonstrate compliance with the monthly and twelve month rolling period limits specified in Table 2.
EU25 EU4-102, EU5-103 EU6-104, EU8-106 EU19-202 EU20-203 EU21-204	Chelsea-Sandwich LLC shall record RTO operating temperatures. Said records shall be stored in a data logging system for easy retrieval when required.
	In the event that the RTO is off line, Chelsea-Sandwich LLC shall record the number of hours that the RTO is not in operation. This information shall be utilized to calculate emissions during such events.
	Chelsea-Sandwich LLC shall calculate and maintain records of the actual emissions of VOC for each month as well as the prior 11 months.
	Chelsea-Sandwich LLC shall keep records on-site of all RTO and capture systems inspection, calibration, maintenance and repair activities performed.
	Chelsea-Sandwich LLC shall keep records on-site of results of any Emissions Compliance Testing (Stack Testing) performed in accordance with 310 CMR 7.13, and 40 CFR Part 60, Appendix A, or of any other testing required by the Department or EPA.
Facility-Wide	Chelsea-Sandwich LLC shall keep records on-site of all inspection and maintenance activities for the facility for operations that contribute to air emissions.
	Chelsea-Sandwich LLC shall maintain on site and accessible at or near the subject equipment, at all times, a copy of this Approval letter and the SOMP for all air-emissions-related equipment at the facility.
	Chelsea-Sandwich LLC shall maintain adequate records on-site to demonstrate compliance with the emission limits as stated in Table 2 of this Approval. At a minimum, the information shall include the calculated facility emissions for the month as well as the prior 11 months. An example of a format that is acceptable to MassDEP is the On-Site Record Keeping Form, which can be downloaded at http://www.mass.gov/dep/air/approvals/reshome.htm.
	Chelsea-Sandwich LLC shall maintain all records or reports required by this Approval on site for five (5) years. All records shall be made available to MassDEP or EPA personnel upon request.

Table 5

EU#	REPORTING REQUIREMENTS
Facility Wide	A final compliance test results report must be submitted by Chelsea-Sandwich LLC to this Office, attention Permit Chief for the Bureau of Waste Prevention, within sixty (60) days of completion of any required compliance testing. Upon MassDEP review and approval of the results, Chelsea-Sandwich LLC shall incorporate the accepted operating parameters into the facility's SOMP.
	Should the RTO become inoperable (i.e., triggering shutdown of the residual loading), for any reason, Chelsea-Sandwich LLC shall take appropriate action in accordance with the SOMP to minimize emissions and diagnose and repair the problem. Chelsea-Sandwich LLC shall notify MassDEP within 24 hours by phone or fax, attention Bureau of Waste Prevention Compliance & Enforcement Chief, at (978) 694-3499 and subsequently in writing within seven (7) days of occurrence describing the reason(s) for and the extent of down time of the equipment and all steps that have been or will be taken to prevent said occurrence from recurring.
	Within ninety (90) days of MassDEP's approval of the compliance test results, Chelsea-Sandwich LLC shall submit to MassDEP, for approval, the final SOMP for the facility, which includes but is not limited to, the operating parameters established during compliance testing and subsequently approved by MassDEP. Chelsea-Sandwich LLC shall operate the facility in accordance with its approved SOMP, including the parameters that were established during the compliance testing and subsequently approved by MassDEP. Future updates to the SOMP shall be submitted to MassDEP within fifteen (15) days of said revisions. MassDEP must approve of significant changes to the SOMP prior to the change becoming effective. The updated SOMP shall supersede prior versions of the SOMP.

Table 5

EU#	REPORTING REQUIREMENTS
Facility Wide	Chelsea-Sandwich LLC shall submit, in writing, an Exceedance Report to MassDEP should the facility exceed any limitation/restriction established in Table 2 of this Approval. Said Exceedance Report shall be submitted within seven (7) days of determination of the exceedance of the limitation/restriction. The Exceedance Report shall include identification, duration, and reason for the exceedance, and the remedial action plan to prevent future exceedances.
	Chelsea-Sandwich LLC shall accurately report to MassDEP, in accordance with 310 CMR 7.12, all information as required by the Source Registration/Emission Statement Form. The facility shall note any minor changes, which did not require Plan Approval (under 310 CMR 7.02, 7.03, etc.) therein.
	Chelsea-Sandwich LLC shall submit semi-annual and annual VOC emissions compliance reports to this Office, attention Bureau of Waste Prevention Permit Chief, by January 30th and July 30th for the applicable twelve month rolling periods.

4. SPECIAL TERMS AND CONDITIONS

The facility is subject to, and shall comply with, the following special terms and conditions:

a) The facility shall install and/or operate an exhaust stack on the RTO (PCD1) that is consistent with good air pollution control engineering practice and that discharges so as to not cause or contribute to a condition of air pollution. The exhaust stack shall be configured to discharge the gases vertically and shall not be equipped with any part or device that restricts the vertical exhaust flow of the emitted gases, including but not limited to rain protection devices "shanty caps" and "egg beaters". Any emission impacts of the exhaust stack upon sensitive receptors including, but not limited to, people, windows and doors that open, and building fresh air intakes shall be minimized by employing good air pollution control engineering practices. Such practices include without limitation: a) avoiding stack locations that may be subject to downwash of the exhaust; and, b) installing stacks of sufficient height in locations that will prevent and minimize exhaust gas impacts upon sensitive receptors. The facility shall install and utilize an exhaust stack with the following parameters (Table 6) for the subject air pollution control device that is regulated by this Approval:

Table 6

EU#	Stack Height Above Ground, feet	Stack Exit Diameter, inches	Maximum Exhaust Gas Exit Velocity, feet per second	Outside Stack Shell Material
PCD1	20	20	81.6	Steel

b) Chelsea-Sandwich LLC shall take necessary precautions to insure that the facility complies with MassDEP's noise guidelines (MassDEP Noise Policy 90-001) and that the facility does not cause a condition of air pollution (noise) as per 310 CMR 7.10. MassDEP Noise Policy 90-001 limits increases over the existing L_{90} ambient background level to 10 decibels, A-weighted (dBA). The L_{90} level represents the sound level exceeded 90 percent of the time and is used by MassDEP for the regulation of noise emissions. Additionally, "pure tone" sounds, defined as any octave band level which exceeds the levels in adjacent octave bands by 3 dBA or more, are also prohibited. Chelsea-Sandwich LLC shall ensure that the facility complies with said Policy at its property line, and that of the nearest inhabited residence:

c) Chelsea-Sandwich LLC shall have readily accessible at all times, sufficient spare parts and equipment that may enable the facility to quickly repair the air pollution control system in the event of problem. This will minimizing the duration and extent of uncontrolled emissions and reduces the likelihood that an odor problem will occur.

d) Chelsea-Sandwich LLC shall comply with 310 CMR 7.09 (1) at all times. 310 CMR 7.09 (1) states that no person having control of any dust or odor generating operations shall permit emissions therefrom which cause or contribute to a condition of air pollution. This air pollution regulation is enforceable by any police department, fire department, board of health officials, or building inspector or their designee acting within their jurisdictional area.

e) Chelsea-Sandwich LLC shall comply with 310 CMR 7.01 (1) at all times. 310 CMR 7.01 (1) states that no person owning leasing or controlling the operation of any air contaminant source shall willfully, negligently, or through failure to provide necessary equipment or to take necessary precautions, permit any air emissions from said air contamination source of such quantities of air contaminants which will cause, by themselves or in conjunction with other air contaminants, a condition of air pollution.

5. GENERAL CONDITIONS

The facility is subject to, and must comply with, the following general conditions:

a) Should any nuisance condition(s), including but not limited to smoke, dust, odor or noise, occur, as the result of the operation of the facility, then the facility shall immediately take appropriate steps to abate said nuisance condition(s).

b) The facility shall allow MassDEP personnel access to the site, buildings, and all pertinent records at all reasonable times for the purpose of making inspections and surveys, collecting samples, obtaining data, and reviewing records.

c) This Approval consists of the Application materials and this Approval letter. If conflicting information is found between these two documents, then the requirements of the Approval letter shall take precedence over the documentation in the Application materials.

d) This Approval does not negate the responsibility of the facility to comply with this or any other applicable federal, state, or local regulations now or in the future. Nor does this Approval imply compliance with this or any other applicable federal, state, or local regulations now or in the future.

e) This Approval may be suspended, modified, or revoked by MassDEP if, at any time, MassDEP determines that the facility is violating any condition or part of this Approval.

f) The MassDEP has determined that the filing of an Environmental Notification Form (ENF) with the Secretary of Environmental Affairs, for air quality purposes, was not required prior to this action by the MassDEP. Notwithstanding this determination, the Massachusetts Environmental Policy Act (MEPA) and Regulation 301 CMR 11.00, Section 11.04; provide certain "Fail-Safe Provisions" which allow the Secretary to require the filing of an ENF and/or Environmental Impact Report at a later time.

g) Failure to comply with any of the above stated conditions will constitute a violation of the "Regulations", and can result in the revocation of the Approval granted herein and/or other appropriate enforcement action as provided by law. MassDEP may also revoke this Approval if the construction work is not begun within two years from the date of issuance of this Approval, or if the construction work is suspended for one year or more.

6. APPEAL PROCESS

This Approval is an action of MassDEP. If you are aggrieved by this action, you may request an adjudicatory hearing. A request for a hearing must be made in writing and postmarked within twenty-one (21) days of the date you received this Approval.

Under 310 CMR 1.01(6)(b), the request must state clearly and concisely the facts, which are the grounds for the request, and the relief sought. Additionally, the request must state why the Approval is not consistent with applicable laws and regulations.

The hearing request along with a valid check payable to the Commonwealth of Massachusetts in the amount of one hundred dollars ($100.00) must be mailed to:

Commonwealth of Massachusetts
Department of Environmental Protection (MassDEP)
P.O. Box 4062
Boston, MA 02211

This request will be dismissed if the filing fee is not paid, unless the appellant is exempt or granted a waiver as described below. The filing fee is not required if the appellant is a city or town (or municipal agency), county, or district of the Commonwealth of Massachusetts, or a municipal housing authority.

MassDEP may waive the adjudicatory hearing-filing fee for a person who shows that paying the fee will create an undue financial hardship. A person seeking a waiver must file, together with the hearing request as provided above, an affidavit setting forth the facts believed to support the claim of undue financial hardship.

Should you have any questions concerning this Approval, please contact Thomas Hannah by telephone at (978) 694-3287, or in writing at the letterhead.

Sincerely,

Thomas A. Hannah
Environmental Engineer

James E. Belsky
Permit Chief
Bureau of Waste Prevention

cc: Board of Health, 500 Broadway, Chelsea, MA 02150
Fire Headquarters, 307 Chestnut Street, Chelsea, Ma 02150

MassDEP/Boston - Yi. Tian (E-Copy)

MassDEP/NERO - Thomas Parks (E-Copy & Hard Copy), Mary Persky